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$$\therefore OL = \frac{(b^2 + d^2 - f^2)(a^2 + b^2 - c^2) + 2b^2(a^2 + f^2 - e^2)}{8 \triangle b}.$$

$$OF = \sqrt{(OL^2 + CL^2 + CF^2)}.$$

When $a=200$, $b=180$, $c=150$, $d=60$, $e=50$, $f=30$,

$$OL^2 = 60363.9509, \quad CL^2 = 9506.25, \quad CF^2 = 900.$$

$$\therefore OF = 266.03 \text{ feet.}$$

Also solved by J. SCHEFFER.

136. Proposed by F. M. PRIEST, Mona House, St. Louis, Mo.

"A pound of gold may be drawn into a wire that would extend around the earth." What would be the diameter of such a wire if the specific gravity of gold is 19.36 and the distance is 24,900 miles?

Solution by J. M. ARNOLD, Crompton, R. I.; G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.; and J. SCHEFFER, A. M., Hagerstown, Md.

62.4 pounds = weight of 1 cubic foot of water. Then, the specific gravity of gold being 19.36, the weight of 1 cubic foot of gold is 19.36×62.4 pounds, or 1208.064 pounds.

Hence, in 1 pound of gold there are $\frac{1728}{1208.64}$ or 1.43039 cu inches nearly.

$$\therefore \frac{1}{4} \pi d^2 \times 24900 \times 5280 \times 12 = 1.43039 \text{ cubic inches.}$$

$$\therefore d = .000034 \text{ inches, nearly.}$$

Mr. Arnold remarks that to measure so small a quantity one would have to estimate 1-12 of one of the divisions of a Brown and Sharp's Micrometer Gage, which reads to the hundredth of a millimeter.

Also solved by ELMER SCHUYLER.

139. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in Irving College Mechanicsburg, Pa.

The ratio of the interest to the true discount on a certain principal for a certain time at a certain rate per cent. per annum, is $m=21$ to $n=20$. What is the rate per cent.?

Solution by P. S. BERG, B. Sc., Principal of Schools, Larimore, N. D.; and ELMER SCHUYLER, M. Sc., Professor of Mathematics, Boys' High School, Reading, Pa.

Let P be the principal; r , the rate; and t , the time in years.

Then the interest, I , is trP .

$$\text{The true discount} = \frac{trP}{1+rt}. \quad \therefore trP : \frac{trP}{1+rt} = m : n = 21 : 20.$$

$$\therefore 1+rt = m/n = \frac{21}{20}, \text{ and } rt = \frac{m-n}{n} = \frac{1}{20}, \text{ or } r = \frac{1}{20t}.$$

Thus r depends on the time.

If $t=1$ year, $r=5\%$.

Also solved by G. B. M. ZERR, J. M. ARNOLD, and J. SCHEFFER.